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**Malone**

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(54) **SYSTEM AND METHOD FOR FILLING CONTAINERS WITH FLUIDS**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

262,517 A 8/1882 Unz et al.  
1,098,286 A 5/1914 Miller  
(Continued)

FOREIGN PATENT DOCUMENTS

AU 2015201240 3/2015  
AU 2015101248 10/2015  
(Continued)

OTHER PUBLICATIONS

“Bunch O Balloons . . . make 100 water balloons in less than a minute!”, published Aug. 5, 2014, [www.youtube.com/watch?v=S1DaXYT6O2A](http://www.youtube.com/watch?v=S1DaXYT6O2A).\*

(Continued)

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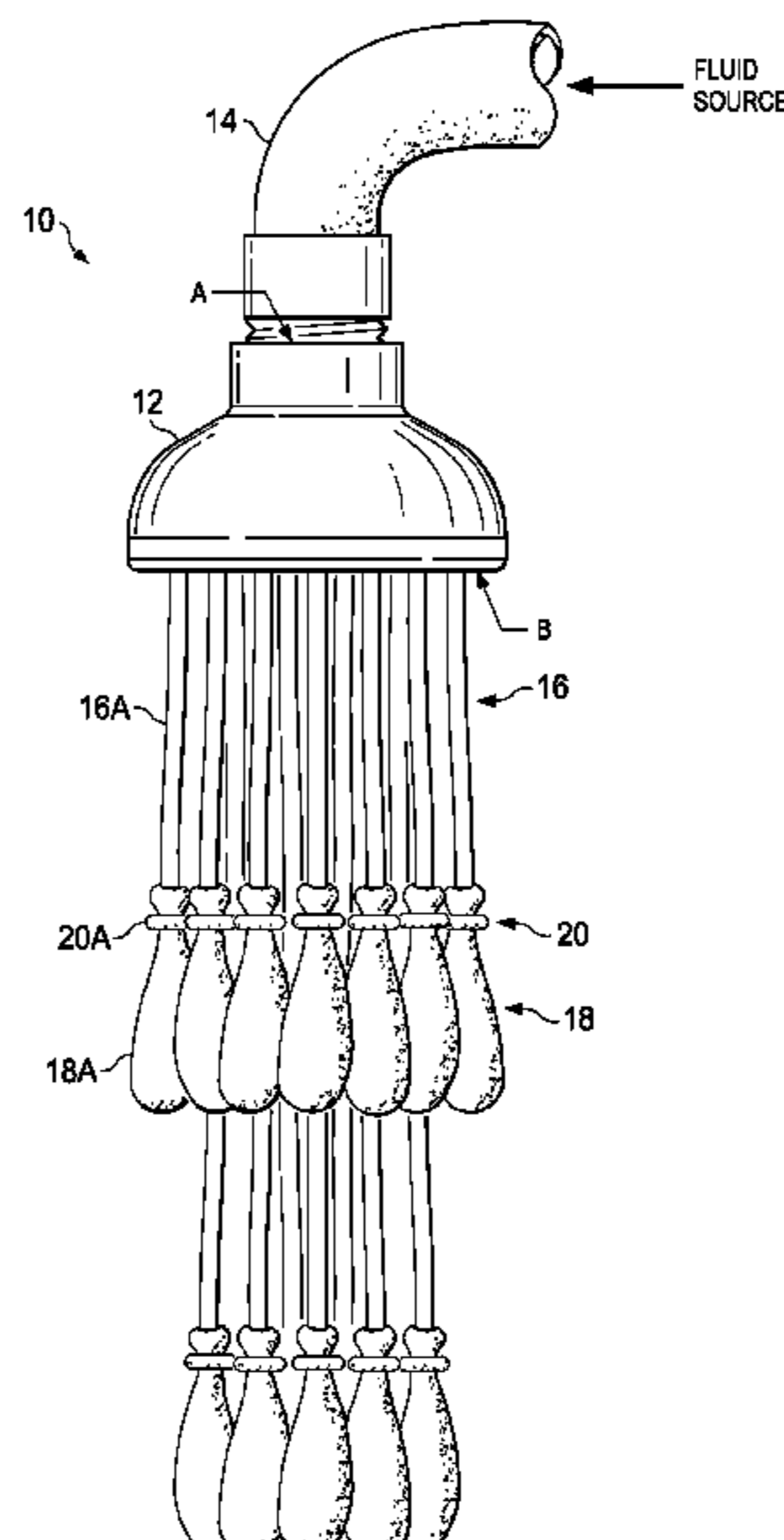
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(57) **ABSTRACT**

An example embodiment of an apparatus includes a housing with an opening at a first end and a plurality of holes at a second end, a plurality of hollow tubes attached to the plurality of holes, a plurality of containers removably attached to the hollow tubes, and a plurality of elastic fasteners, each elastic fastener clamping each container to a corresponding hollow tube, such that when the containers are filled with fluid and detached from the corresponding hollow tubes, each elastic fastener seals each container with the fluid inside.

**23 Claims, 6 Drawing Sheets**



<b>Related U.S. Application Data</b>					
		5,301,392 A	4/1994	Richman	
		5,370,161 A	12/1994	Shafer	
		5,381,964 A	1/1995	Reyna	
(60)	Provisional application No. 61/942,193, filed on Feb. 20, 2014, provisional application No. 61/937,083, filed on Feb. 7, 2014.	5,439,199 A	8/1995	Briggs et al.	
		5,444,962 A *	8/1995	Bonnet .....	B65B 51/00 53/139.1
		5,465,833 A *	11/1995	Tarter .....	A61K 6/10 206/219
(51)	<b>Int. Cl.</b>				
	<i>A61B 5/15</i> (2006.01)	5,496,203 A	3/1996	Murray	
	<i>A61B 10/00</i> (2006.01)	5,509,540 A	4/1996	Pomerantz	
	<i>A63H 27/10</i> (2006.01)	5,531,626 A	7/1996	Deal	
	<i>A61B 5/155</i> (2006.01)	5,538,456 A	7/1996	Liu et al.	
	<i>B65B 3/00</i> (2006.01)	5,588,896 A	12/1996	Goodman	
		5,628,091 A	5/1997	Mueller	
		5,639,526 A	6/1997	Kotsiopoulos et al.	
(52)	<b>U.S. Cl.</b>	5,732,530 A	3/1998	Pfaff	
	CPC .. <i>A61B 5/150221</i> (2013.01); <i>A61B 5/150366</i> (2013.01); <i>A61B 10/007</i> (2013.01); <i>A63H 27/10</i> (2013.01); <i>B65B 3/003</i> (2013.01); <i>B65B 3/26</i> (2013.01); <i>A63H 2027/1033</i> (2013.01); <i>A63H 2027/1041</i> (2013.01)	5,755,419 A	5/1998	Gearhart	
		5,826,803 A	10/1998	Cooper	
		5,944,576 A	8/1999	Nelson	
		5,964,636 A	10/1999	Carrera	
		5,975,983 A	11/1999	Panec	
		6,007,403 A	12/1999	Urspringer	
(58)	<b>Field of Classification Search</b>	6,024,251 A	2/2000	Mayer	
	USPC .... 141/10, 144, 234–248; 383/3, 43, 44, 48, 383/49, 71, 78; 446/220–226	6,047,866 A	4/2000	Brown	
	See application file for complete search history.	6,106,135 A	8/2000	Zingale	
		6,149,488 A	11/2000	Stark	
		6,158,619 A	12/2000	D'andrade	
		6,176,758 B1	1/2001	Wu	
(56)	<b>References Cited</b>	6,179,823 B1	1/2001	Niedospial, Jr.	
	<b>U.S. PATENT DOCUMENTS</b>	6,386,938 B1	5/2002	Novak	
		6,419,825 B1	7/2002	Hahmann et al.	
		6,478,057 B1	11/2002	Bearss	
		6,478,651 B1	11/2002	Weir	
		6,488,557 B1	12/2002	Elliott et al.	
		6,527,615 B1	3/2003	Boehler	
		6,558,223 B1	5/2003	Matthews	
		6,598,807 B1	7/2003	Anzalone	
		6,716,083 B1	4/2004	Castro	
		6,793,094 B2	9/2004	Turnbough	
		7,343,933 B2	3/2008	McBeth et al.	
		7,388,041 B2	6/2008	Cegelski et al.	
		7,444,938 B2	11/2008	Tippmann	
		7,445,533 B2	11/2008	Norton et al.	
		7,479,130 B2	1/2009	Trickett	
		7,762,214 B2	7/2010	Ritchey	
		8,037,906 B1	10/2011	Grillo	
		8,141,326 B2	3/2012	Wang	
		8,251,111 B2	8/2012	Nelson et al.	
		8,281,961 B2	10/2012	Martin	
		8,479,776 B2	7/2013	Berardi	
		8,733,675 B2	5/2014	Leber	
		8,789,565 B1	7/2014	Wicken	
		9,051,066 B1	6/2015	Malone	
		9,242,749 B2	1/2016	Malone	
		9,315,282 B2	4/2016	Malone	
		9,527,612 B2	12/2016	Malone	
		9,533,779 B2	1/2017	Malone	
		2001/0003505 A1	6/2001	Bertrand	
		2004/0127311 A1	7/2004	Brock	
		2004/0174718 A1	9/2004	Ohlund	
		2005/0004430 A1 *	1/2005	Lee .....	A61F 5/0036 600/116
		2005/0132821 A1 *	6/2005	Furey .....	G01N 1/10 73/863.31
		2005/0138862 A1	6/2005	O'connor	
		2005/0176339 A1	8/2005	Cuisinier	
		2006/0291217 A1	12/2006	Vanderschuit	
		2007/0167107 A1	7/2007	Petell et al.	
		2007/0275615 A1	11/2007	Norton et al.	
		2008/0121309 A1	5/2008	Boise	
		2008/0166943 A1	7/2008	Hou	
		2010/0326212 A1	12/2010	Furey et al.	
		2011/0079316 A1	4/2011	Ramere	
		2011/0151744 A1	6/2011	Archer	
		2011/0253256 A1	10/2011	Finley	
		2012/0312388 A1 *	12/2012	Jian .....	B65D 81/052 137/223
		2013/0118640 A1	5/2013	Saggio	
		2013/0226219 A1	8/2013	Brister et al.	

(56)

## References Cited

## U.S. PATENT DOCUMENTS

2014/0030452 A1 1/2014 Warner  
 2014/0076454 A1 3/2014 Kjar  
 2014/0212074 A1 7/2014 Durst  
 2014/0316207 A1 10/2014 Hain  
 2015/0020480 A1 1/2015 Harris  
 2015/0056887 A1 2/2015 Harter et al.  
 2016/0052656 A1 2/2016 Malone  
 2016/0083121 A1 3/2016 Malone  
 2016/0083122 A1 3/2016 Malone  
 2016/0101882 A1 4/2016 Malone

## FOREIGN PATENT DOCUMENTS

CN	201161115	12/2008
DE	2421990	11/1975
DE	102015206176	4/2015
EP	1548420	6/2005
FR	2911512	* 7/2008
FR	3017381	8/2015
GB	294273	7/1928
GB	1277377	6/1972
GB	2476817 A	7/2011
WO	WO9408849	4/1994
WO	WO2015/027187	2/2015
WO	WO2015027187	2/2015
WO	WO2015118518	8/2015
WO	WO2015119516	8/2015

## OTHER PUBLICATIONS

<https://www.youtube.com/watch?y=HIZjZII2O8o>, accessed Apr. 7, 2015, allegedly published May 12, 2014.  
<https://www.youtube.com/watch?y=wCajj0KPV7c>, accessed Apr. 7, 2015, allegedly published Aug. 19, 2014.  
*Telebrands Corp. v. Tinnus Enterprises, LLC*, No. PGR2016-0018 (P.T.A.B. Dec. 30, 2016), Final Written Decision, Paper No. 75.  
 Search and Examination Report from the United Kingdom Patent Office, United Kingdom patent application 1504038.9.  
 Examination Report from the Australian Patent Office, Patent App. No. 2015101248.  
 International Search Report issued by the Australian Patent Office, PCT/IB2015/051747.

International Search Report issued by the New Zealand Patent Office, PCT/NZ2015/050025.

Opinion of International Preliminary Examining Authority, Australian Patent Office, PCT/IB2015/051747.

European Search Report, EP15158482.

Extended European Search Report, Belgian Patent Office, App. No. 201505223.

Novelty Search Report, Hungarian Patent Office, App. No. P1500153.

Bunch O Balloons Kickstarter page, available at <https://www.kickstarter.com/projects/bunchoballoons/bunch-oballoons-100-water-balloons-in-less-than-1>, printed Aug. 9, 2015.

“Bunch O Balloons . . . make 100 water balloons in less than a minute!”, available at <https://www.youtube.com/watch?v=S1DaXYT6O2A>, according to the International Search Report for PCT/IB2015/051747: “Viewed on internet on Aug. 20, 2015 . . . Published on Aug. 5, 2014”.

<https://www.youtube.com/watch?v=-HIZjZ112O8o>, accessed Apr. 7, 2015, allegedly published May 12, 2014.

<https://web.archive.org/web/20130609045215/http://www.conwinonline.com/shop/air-force-4>.

“Balloon Powered Boat,” available at <http://alittlelearningfortwo.blogspot.com>.

YouTube video of the ZORBZ Replicator, available at <https://www.youtube.com/watch?v=wCajj0KPV7c>, accessed Apr. 7, 2015, allegedly published Aug. 19, 2014.

Answer of Defendant Telebrands Corp., filed on May 10, 2016, in *Tinnus Enterprises, LLC et al. v. Telebrands Corp.*, Civ. No. 6:16-CV-00033-RWS-JDL.

Amazon Customer Review, “These balloons are filled with colored water for even more fun!”, dated Jun. 9, 2016, available at [https://www.amazon.com/gp/customer-reviews/R1OODMIEHRQXR0/ref=cm\\_cr\\_getr\\_d\\_rvw\\_ttl?ie=UTF8&ASIN=B01C0OIRTE](https://www.amazon.com/gp/customer-reviews/R1OODMIEHRQXR0/ref=cm_cr_getr_d_rvw_ttl?ie=UTF8&ASIN=B01C0OIRTE).

<https://web.archive.org/web/20160606220014/http://www.zimplikids.com/new-2016-slime-bombz.html>.

*Telebrands Corp. v. Tinnus Enterprises, LLC*, No. PGR2016-0031 (P.T.A.B. Feb. 21, 2017), Decision: Institution of Post-Grant Review, Paper No. 15.

*Telebrands Corp. v. Tinnus Enterprises, LLC*, No. PGR2016-0030 (P.T.A.B. Feb. 21, 2017), Decision: Institution of Post-Grant Review, Paper No. 16.

Extended European Search Report, EP15158482.

Great Britain Search Report, GB1606061.8.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

Great Britain Examination Report, GB1504038.9.

\* cited by examiner

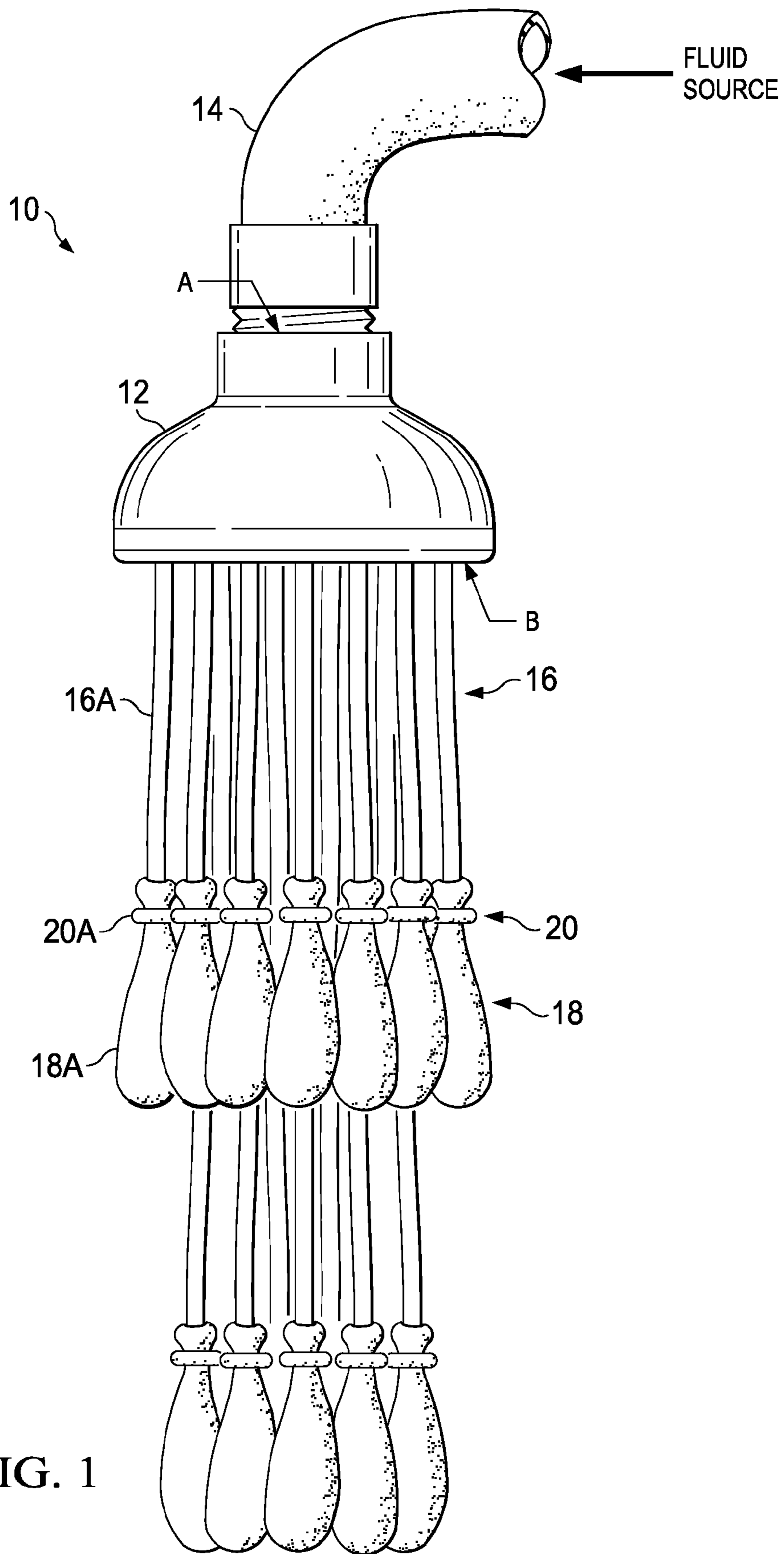


FIG. 1

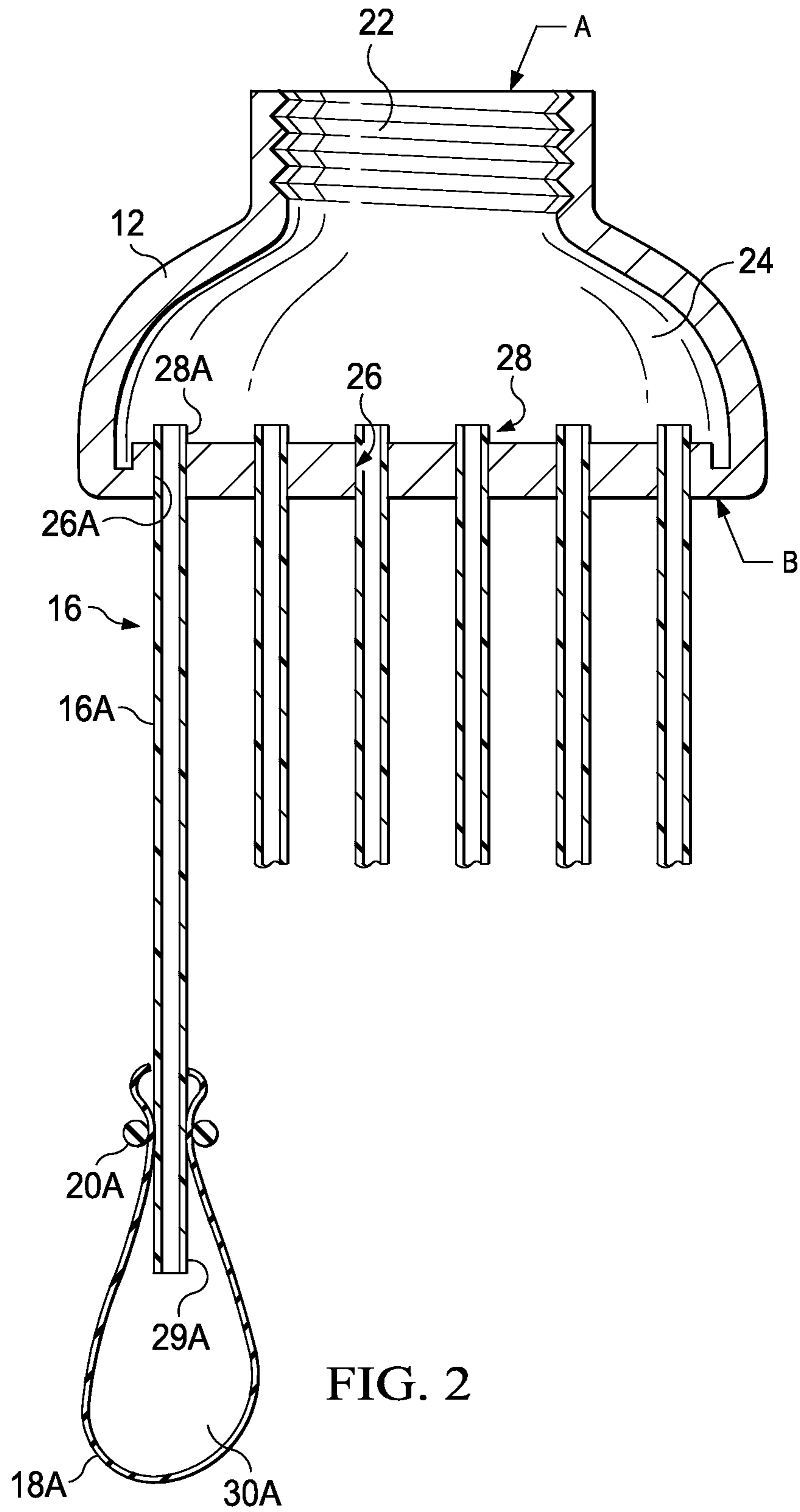
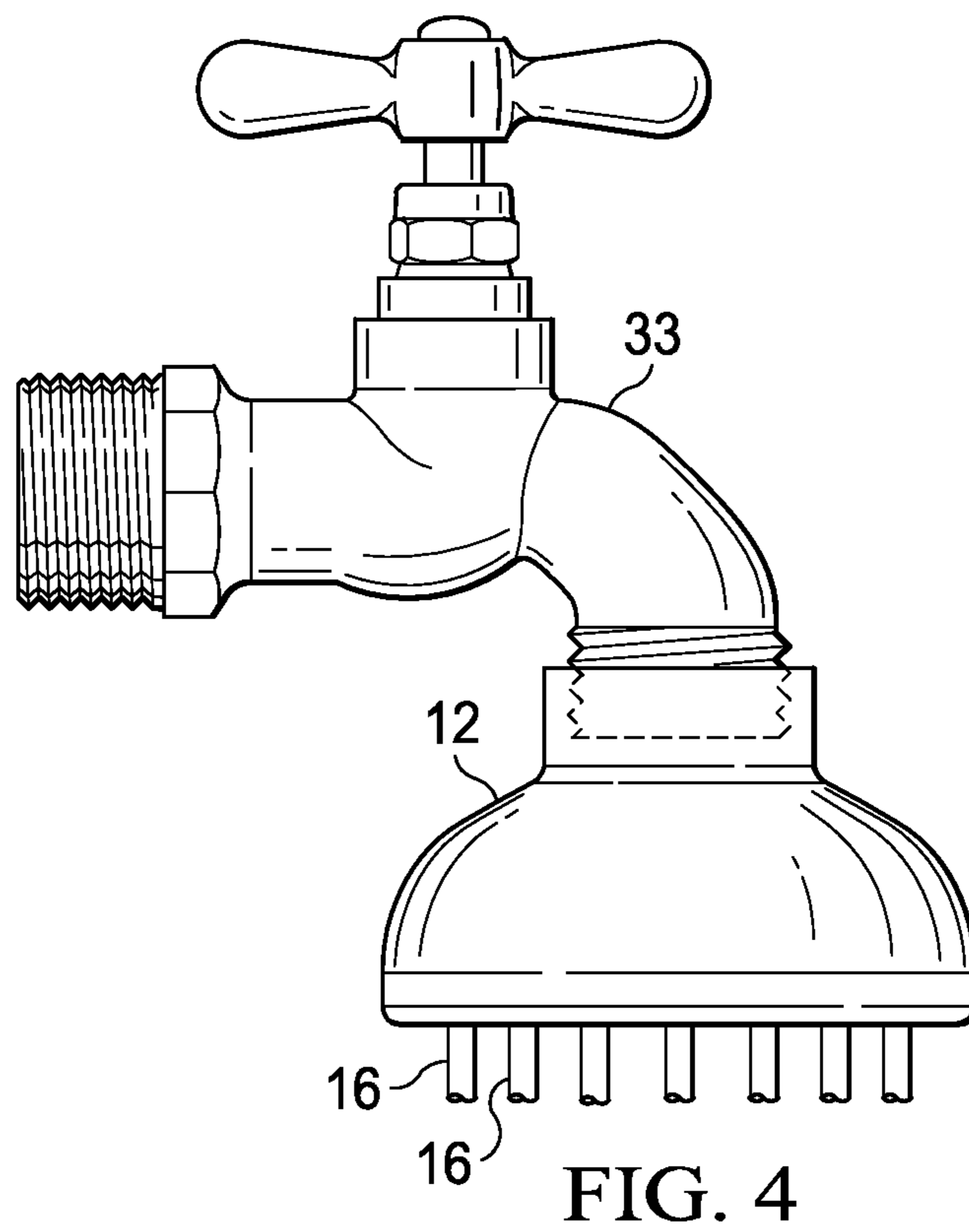
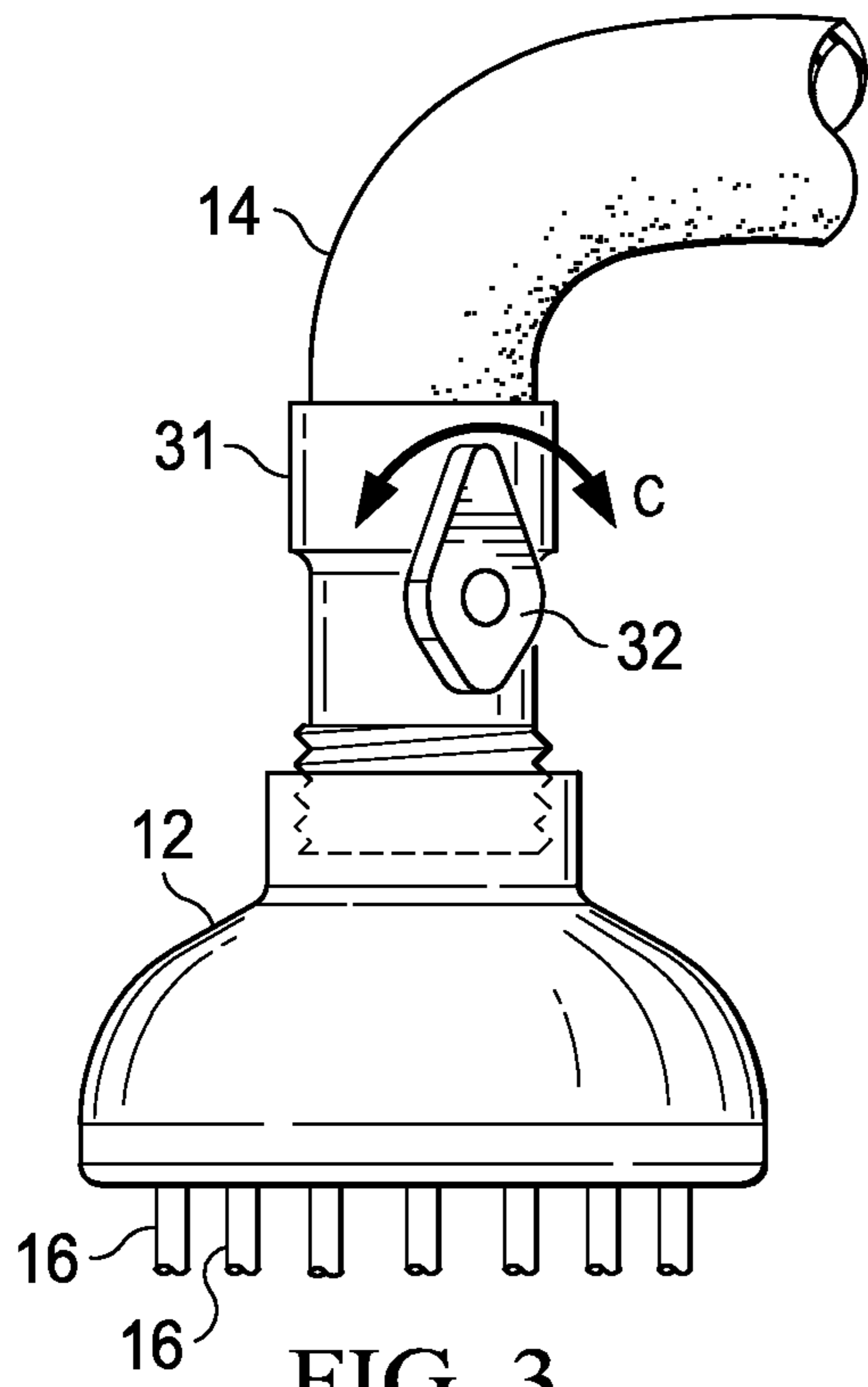


FIG. 2



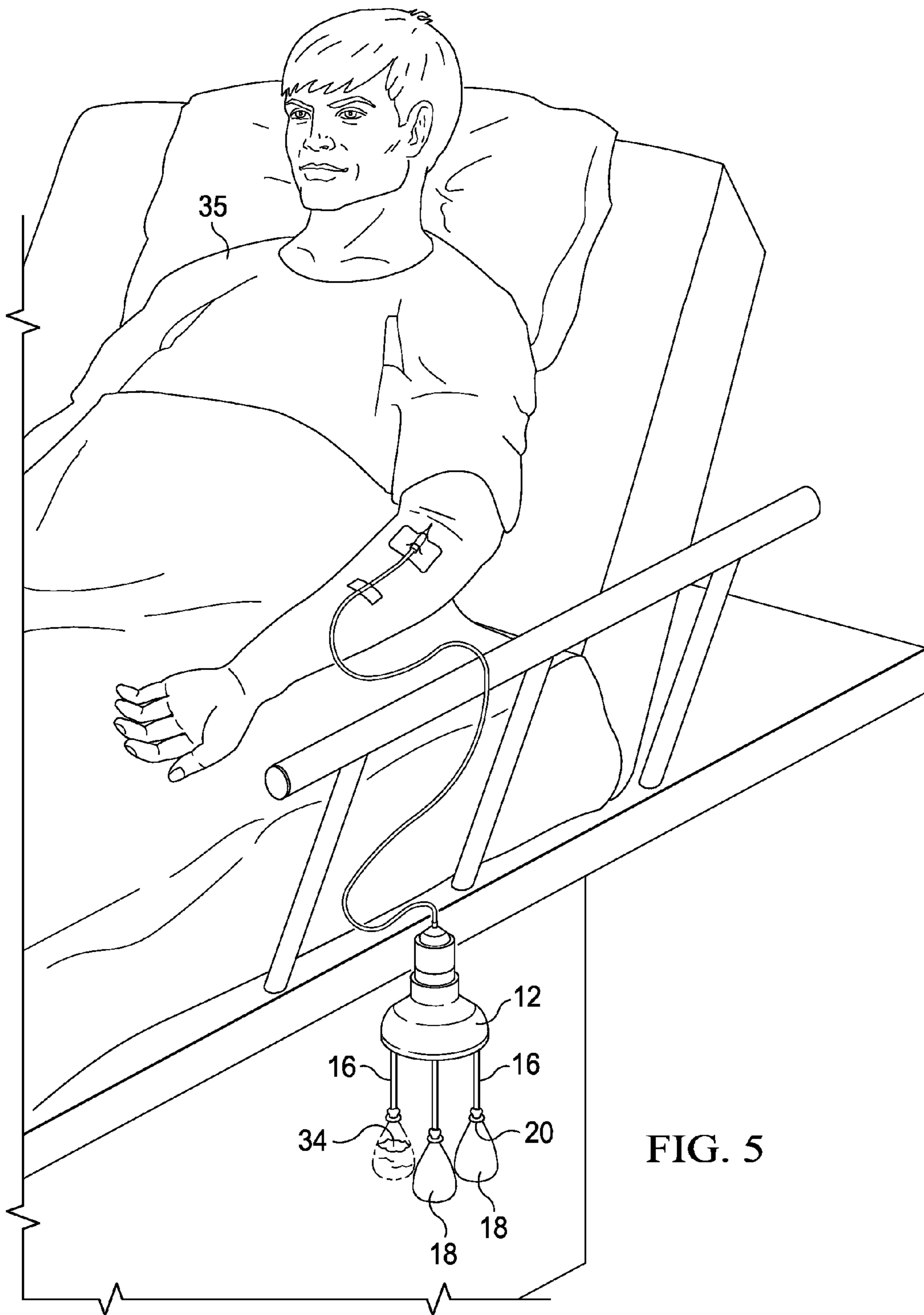
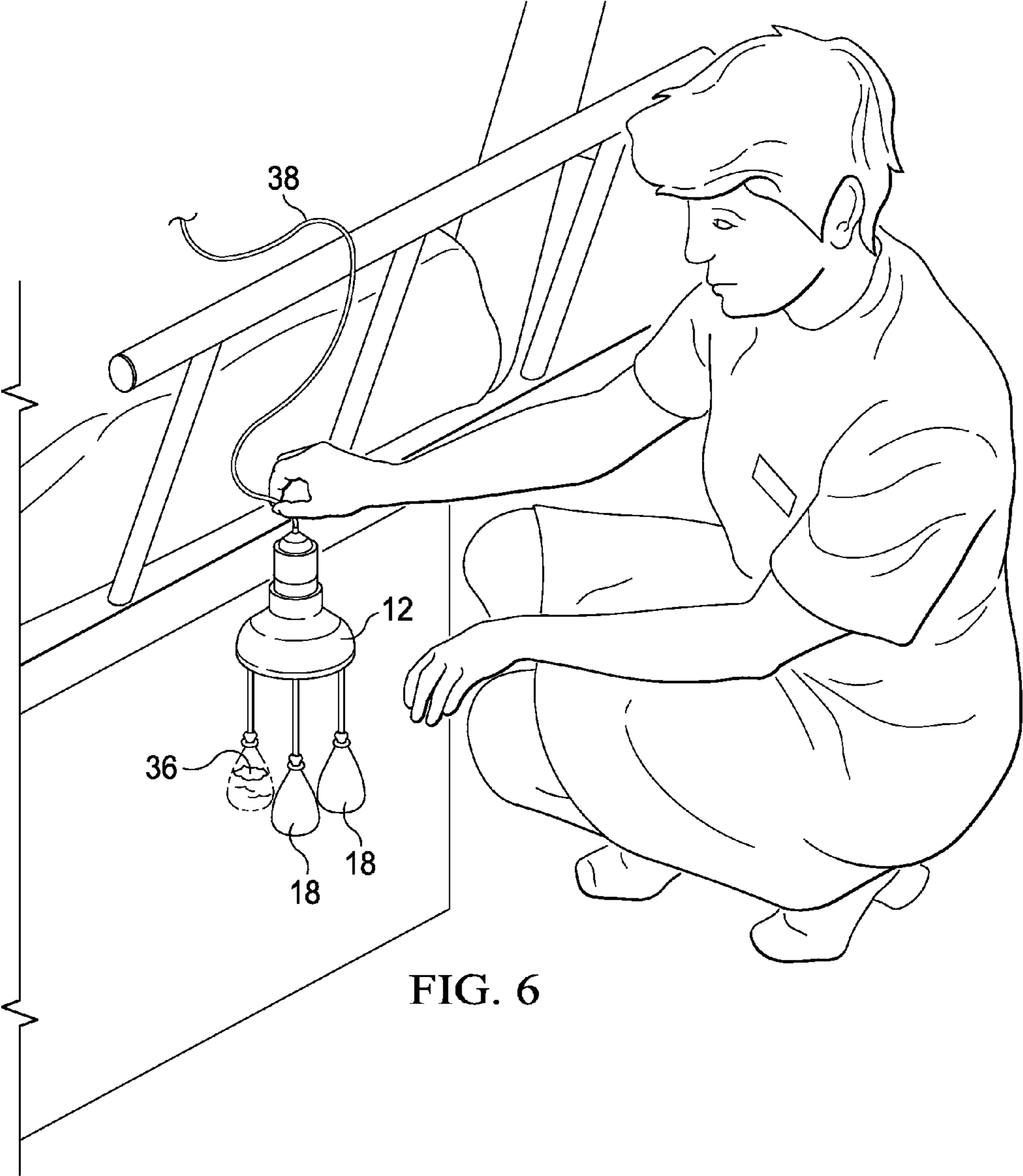


FIG. 5





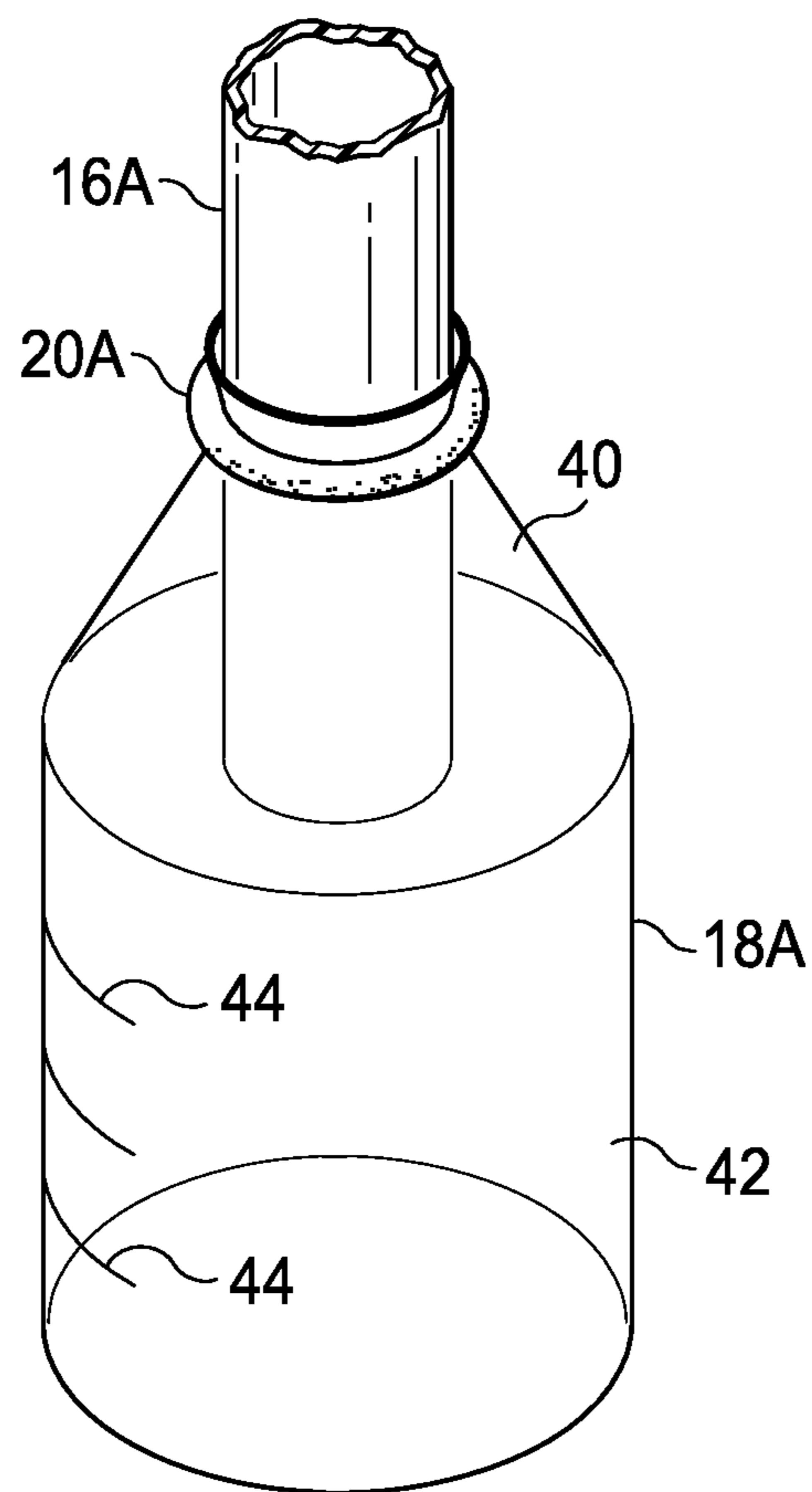


FIG. 7

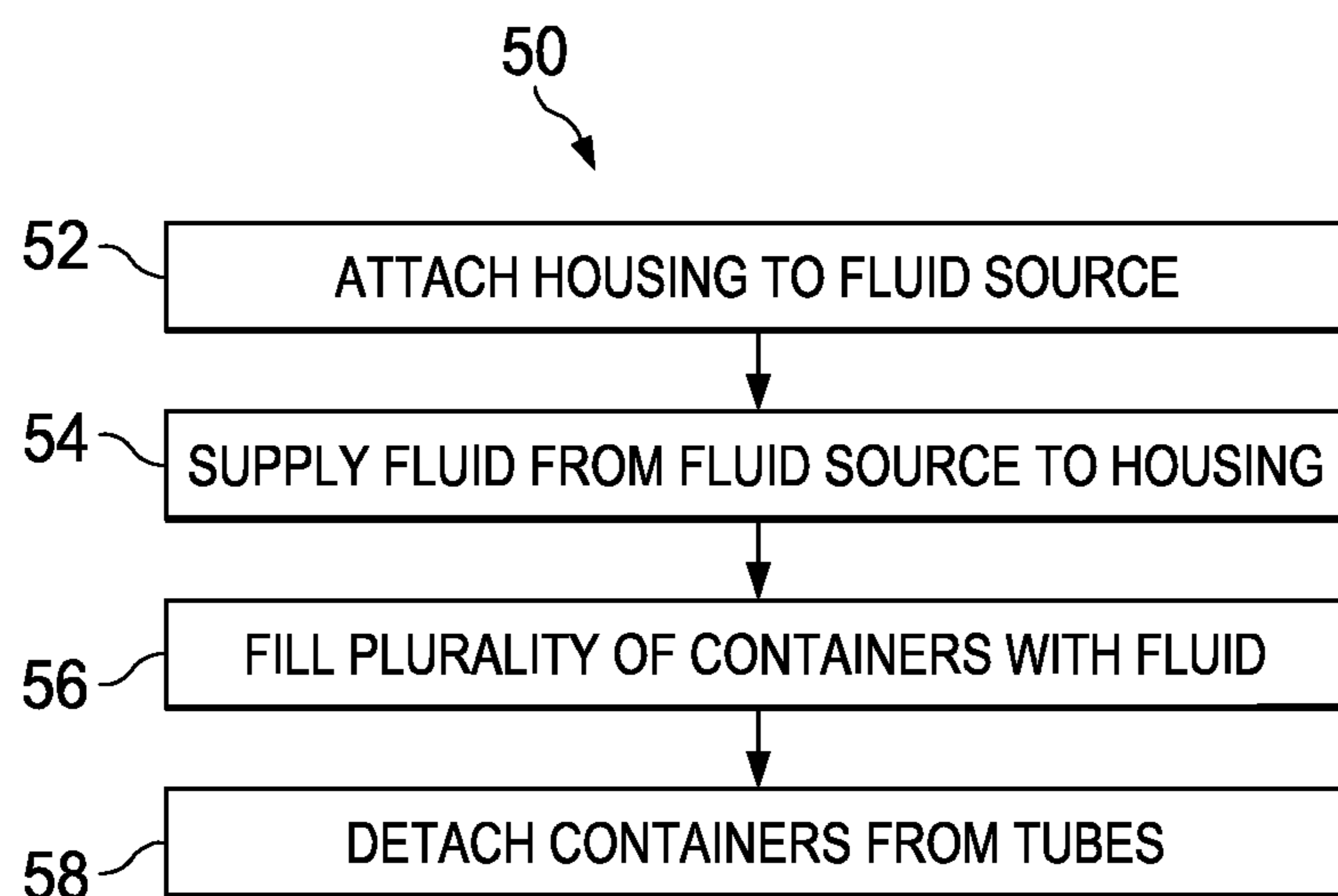


FIG. 8

## SYSTEM AND METHOD FOR FILLING CONTAINERS WITH FLUIDS

### CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation of and claims benefit from U.S. patent application Ser. No. 14/492,487 entitled "SYSTEM AND METHOD FOR FILLING INFLATABLE CONTAINERS WITH LIQUID," filed Sep. 22, 2014, which claims the benefit under 35 U.S.C. §119(e) from U.S. Provisional Application Ser. Nos. 61/937,083 and 61/942,193, filed Feb. 7, 2014 and Feb. 20, 2014, respectively, which applications are all incorporated herein by reference in their entireties.

### TECHNICAL FIELD

The present disclosure relates generally to fluid inflatable systems and more particularly, to a system and method for filling containers with fluids.

### BACKGROUND

Inflatable containers such as balloons can be filled with a variety of fluids, such as air, helium, water, medicines, etc. In some cases, a lot of inflatable containers may need to be filled with fluids. For example, balloons used as props in conventions, large parties, etc. may number in the hundreds and may require substantial human effort to fill them all in a timely manner. In another example, water balloons used as kids' toys may need to be filled in large numbers to aid in various games. Various methods may be employed to fill such inflatable containers. For example, an individual may blow up and tie each balloon by hand or use a tank of compressed air or helium to inflate the balloon, which then has to be tied. In another example, an individual may fill water balloons with water by hand one at a time, and then tie the balloons, which can all be quite time-consuming. Moreover, the inflatable containers may be damaged or filled to different volumes.

### BRIEF DESCRIPTION OF THE DRAWINGS

To provide a more complete understanding of the present disclosure and features and advantages thereof, reference is made to the following description, taken in conjunction with the accompanying figures, wherein like reference numerals represent like parts, in which:

FIG. 1 is a simplified perspective view illustrating an example configuration of an embodiment of a system for filling containers with fluids;

FIG. 2 is a simplified diagram illustrating a cross-sectional view of example details of an embodiment of the system;

FIG. 3 is a simplified diagram illustrating other example details of an embodiment of the system;

FIG. 4 is a simplified diagram illustrating yet other example details of an embodiment of the system;

FIG. 5 is a simplified diagram illustrating yet other example details of an embodiment of the system;

FIG. 6 is a simplified diagram illustrating yet other example details of an embodiment of the system;

FIG. 7 is a simplified diagram illustrating yet other example details of an embodiment of the system; and

FIG. 8 is a simplified flow diagram illustrating example operations that may be associated with an embodiment of the system.

## DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

### Overview

An example embodiment of an apparatus includes a housing (e.g., casing, covering, etc. with a cavity inside) with an opening at a first end and a plurality of holes at a second end, a plurality of hollow tubes attached to the plurality of holes, a plurality of containers (e.g., receptacles, vessels, ampules, test-tubes, balloons, etc.) removably attached to the hollow tubes, and a plurality of elastic fasteners, each elastic fastener clamping each container to a corresponding hollow tube, such that when the containers are filled with fluid and detached from the corresponding hollow tubes, each elastic fastener seals each container with the fluid inside.

### Example Embodiments

It is to be understood that the following disclosure describes several example embodiments for implementing different features, structures, or functions of the system. Example embodiments of components, arrangements, and configurations are described herein to simplify the present disclosure. However, these example embodiments are provided merely as examples and are not intended to limit the scope of the invention.

The present disclosure may repeat reference numerals and/or letters in the various exemplary embodiments and across the Figures provided herein. This repetition is for the purpose of simplicity and clarity and does not in itself indicate a relationship between the various exemplary embodiments and/or configurations discussed in the various Figures.

FIG. 1 is a simplified diagram illustrating an example embodiment of a system **10** for filling containers with fluids. System **10** includes a housing **12** removably attached to a hose **14** (e.g., tube, pipe, etc.) on a first end A and to a plurality of hollow tubes **16** on a second end B. As used herein, the term "housing" encompasses a hollow space enclosed by a rigid or semi-rigid casing (e.g., covering, skin, sleeve, sheath, etc.). In some embodiments, end A may include a threaded opening configured to mate with corresponding threads on hose **14**. In some embodiments, end A may be smaller in circumference or area than end B. Hose **14** may be connected to a fluid source, such as a water tank, gas tank, water supply line, etc. on end A. End B may include a plurality of holes (e.g., configured in an array), configured to fit tubes **16**. In some embodiments, tubes **16** may be permanently attached (e.g., welded, brazed, stuck with adhesives, press-fitted, etc.) to housing **12**. In other embodiments, tubes **16** may be removably attached (e.g., with threads, pressure, etc.) to housing **12**.

A plurality of containers **18** may be clamped (e.g., attached, fastened, held, clinched, secured, etc.) to plurality of tubes **16** using elastic valves **20**. As used herein, the term "container" refers to an object that can hold something, such as fluids. The term "valve" refers to an object that regulates, directs, or controls the flow of fluids, by opening, closing, or partially obstructing passageways of fluid flow. In an example embodiment, elastic valves **20** comprise elastic fasteners, such as O-rings. In another example embodiment, elastic valves **20** comprise corrugations, smocking, elastic fibers, etc. fabricated into the necks of containers **18** such that force is required to pull open the necks of containers **18**, and removal of the force causes the necks to constrict and close. In yet another example embodiment, elastic valves comprise internal or external plugs affixed to

the necks of containers 18, through which tubes 16 may be pushed through to clamp containers 18 thereto.

Note that each of containers 18 have an opening to facilitate clamping to tubes 16 and a cavity for containing fluid. For example, one end of an example tube 16A may be fitted through a hole in end B of housing 12, and the other end of tube 16A may be inserted into an example container 18A. An example elastic valve 20A (e.g., O-ring, comprising a mechanical gasket typically in a toroid shape; elastic ring, such as a rubber-band) of sufficient size to expand and clamp around tube 16A may be disposed around (e.g., placed over) a neck (e.g., portion just below opening) of container 18A, clamping and sealing container 18A to tube 16A. Thus, elastic valve 20A may be in an open configuration when container 18A is attached to tube 16A; in elastic valve 20A's open configuration, the neck of container 18A is open, allowing container 18A to fill with fluid. After container 18A is filled with fluid, it may be removed from tube 16A, whereupon elastic valve 20A closes, thereby closing the neck of container 18A and sealing the fluid inside.

In one example embodiment, containers 18 may comprise inflatable balloons that may be filled with fluids such as water, air or helium. In another example embodiment, containers 18 may comprise flexible (e.g., stretchy, springy, etc.) elastic containers that may be filled with gaseous or liquid medications. As used herein, the term "elastic" is meant to refer to a property of a material that allows the material to resume its normal shape spontaneously after contraction, dilation, or distortion. In an example, an elastic material may be stretched to 200% of its original length, and the material may return to its original length when the stretching force is removed.

In yet another example embodiment, containers 18 may comprise flexible containers that may be filled with body fluids (e.g., urine, blood) for example, to collect multiple samples simultaneously for testing. Virtually any type and kind of fluid may be used within the broad scope of the embodiments. Note that in some embodiments, containers 18 need not be inflatable or flexible in their entireties. For example, a bottom portion of containers 18 may be inelastic (e.g., glass, plastic, metal, etc., of fixed shape and size), and a top portion may be flexible enough to be inserted around tubes 16 and clamped thereon.

When the fluid source is turned on, fluid may flow through housing 12, tubes 16 and fill containers 18. In some embodiments, when housing 12 is connected to a stream of liquid, containers 18 may be filled with the liquid. In some embodiments, the fluid may be supplied at high pressure. Virtually any mechanism that facilitates fluid flow through tubes 16 at sufficient pressure to fill containers 18 may be used within the broad scope of the embodiments. After containers 18 have reached a desired size or volume, they may be detached from tubes 16. In one example embodiment, filled containers 18 may be detached by pulling them away from tubes 16.

In another example embodiment, the connecting force holding filled containers 18 to tubes 16 may be overcome by an upward acceleration on tubes 16, for example, when they are shaken. Thus, filled containers 18 may be detached by shaking housing 12 (or tubes 16) sufficiently vigorously to cause containers 18 to fall off from tubes 16. In some embodiments, the connecting force holding filled container to its corresponding tube is not less than the weight of the filled container; in a specific embodiment, the connecting force holding each container to its corresponding tube is exactly equal to the weight of the filled container. The connecting force may be provided by a combination of constricting forces and friction forces from elastic valves 20.

In yet other embodiments, containers 18 may fall off under gravity; for example, when filled containers 18 reach a threshold weight, they slip off tubes 16 due to gravity. The threshold weight may be based upon the tightness of elastic valves 20, friction between tubes 16 and containers 18, and force from the weight of containers 18 (among other parameters). In various embodiments, containers 14 may slide off tubes 16 and elastic valves 20 may constrict the necks of containers 18, sealing them. In some embodiments, containers 18 may be marked with volumetric measurements, and fluid flow may be turned off when the fluid has filled containers 18 to a desired volume.

In some embodiments, hollow tubes 16 may be made of a rigid material (e.g., steel, glass); in other embodiments, tubes 16 may be made of a flexible material (e.g., thin plastic). In some embodiments, tubes 16 may be thick, short and rigid; in other embodiments, tubes 16 may be slender, long and flexible. Thus, hollow tubes 16 may be flexible, semi-rigid, or rigid, based on its material of construction, design, or a combination thereof. Note that tubes 16 may be of different lengths, for example, to prevent crowding and to accommodate a larger number of containers 18 than would be possible if tubes 16 were of the same length. Thus, at least some of hollow tubes 16 may be of different lengths than the others.

Also, tubes 16 may be flexible to enable containers 18 to expand. Thus, as containers 18 fill with fluid and expand, they may push against each other, flexing tubes 16. The outermost tubes 16 may be flexed more than the innermost tubes 16 (outer and inner being in reference to a center-point of housing 12, with the inner tubes 16 being closer to the center-point, and the outer tubes 16 being farther from the center-point).

Turning to FIG. 2, FIG. 2 is a simplified cross-sectional view of a portion of an embodiment of system 10. Housing 12 comprises a threaded opening 22 at end A, an internal cavity 24, and an array of holes 26 at end B. Internal cavity 24 facilitates distributing the fluid entering at threaded opening 22 to array of holes 26 at end B. In some embodiments, threaded opening 22 may be configured for attaching to a fluid supply hose 14 (e.g., garden hose, plastic tube, etc.). In other embodiments, threaded opening 22 may be attached to corresponding threads in a valve. Array of holes 26 may be configured for connecting first ends 28 of tubes 16 by any suitable means. In some embodiments, first ends 28 of tubes 16 may be connected to corresponding holes 26 by compressing or gluing. In some embodiments, a number of holes 26 in housing 12 and a number of tubes 16 can correspond to a number of containers 18 that are desired to be filled and sealed substantially simultaneously.

To clarify further, only one example tube 16A is shown in the figure. A first end 28A of tube 16A is fitted through a corresponding hole 26A in housing 12. A second end 29A of tube 16A is inserted into container 18A. Elastic valve 20A may be placed around the neck of container 18A clamping the neck to tube 16A. An internal volume 30A of container 18A may be filled with fluid appropriately.

To fill and seal containers 18, housing 12 may be attached to a fluid supply tube (e.g., garden hose) and the fluid supply may be turned on. The fluid enters housing 12, is distributed to holes 26, travels down tubes 16, and fills containers 18. Containers 18 may be filled and may expand substantially simultaneously. When containers 18 have reached a desired size and/or they are filled with the desired volume of fluid, they may be removed from tubes 16. They can be removed by falling off, by shaking them off, by pulling them off by hand, etc. As each container 18A is removed from corre-

## 5

sponding tube 16A, respective elastic valve 20A may constrict and close the neck of container 18A, sealing it with the fluid inside.

Turning to FIG. 3, FIG. 3 is a simplified diagram illustrating example details of a valve 31 that may be attached between hose 14 and housing 12 according to an embodiment of system 10. One end of valve 31 may be attached to hose 14 and the other end may be attached to threaded opening 22 of housing 12 (e.g., using threads). A lever 32 may be turned from one side (of valve 31) to another (e.g., as indicated by arrow C) to turn on and turn off fluid flow to housing 12. For example, to turn on the fluid flow, lever 32 may be turned to a first position; lever 32 may be turned to a second position (e.g., different from the first position) to turn off fluid flow.

Turning to FIG. 4, FIG. 4 is a simplified diagram illustrating example details of an embodiment of system 10. Housing 12 may be attached to a spigot 33 (e.g., nozzle, faucet, outlet, etc.) that connects to the fluid source. Spigot 33 may be turned on or turned off to start or stop fluid flow to housing 12.

Turning to FIG. 5, FIG. 5 is a simplified diagram illustrating example details of an application of an embodiment of system 10. Embodiments of system 10 may be used in a variety of applications, such as for collecting numerous blood samples substantially simultaneously. Blood 34 may be drawn from a human (or animal) and blood 34 may collect substantially simultaneously in plurality of containers 18. The substantial simultaneous collection of blood in such manner can ease patient pain, speed up sampling time, and enable taking multiple samples substantially simultaneously without cross-contamination from one container to another or messy transfers between containers.

Turning to FIG. 6, FIG. 6 is a simplified diagram illustrating example details of an application of an embodiment of system 10. Embodiments of system 10 may be used in a variety of applications, such as for collecting numerous urine samples substantially simultaneously. Urine 36 may be drawn from a human (or animal) through a suitable catheter 38, and may collect substantially simultaneously in plurality of containers 18.

Turning to FIG. 7, FIG. 7 is a simplified diagram illustrating example details of an embodiment of system 10. Example container 18A may comprise a flexible portion 40 and an inflexible portion 42. Flexible portion 40 may be clamped on to example tube 16A using example elastic valve 20A. In some embodiments, container 18A may comprise volumetric measurement markings 44. When fluid fills container 18A to a desired volume, for example, as indicated by volumetric measurement marking 44, container 18A may be detached from tube 16A, whereupon elastic valve 20A may close container 18A, sealing the fluid inside.

Turning to FIG. 8, FIG. 8 is a simplified flow diagram illustrating example operations that may be associated with an embodiment of system 10. At 52, housing 12 may be attached to a fluid source (e.g., through hose 14, spigot 33, etc.) At 54, fluid may be supplied from the fluid source to housing 12. At 56, plurality of containers 18 may be filled with the fluid. At 58, containers 18 may be detached from corresponding tubes 16.

Note that in this Specification, references to various features (e.g., elements, structures, modules, components, steps, operations, characteristics, etc.) included in "one embodiment", "example embodiment", "an embodiment", "another embodiment", "some embodiments", "various embodiments", "other embodiments", "alternative embodiment", and the like are intended to mean that any such

## 6

features are included in one or more embodiments of the present disclosure, but may or may not necessarily be combined in the same embodiments.

The elements described herein may be made of any suitable materials, including metal (e.g., stainless steel, copper, brass, bronze, aluminum, etc.), plastic, glass, elastomers, or any suitable combination thereof. Each element may also be made of a combination of different materials (e.g., housing and tubes may be made of plastic and containers may be made of elastic rubber; housing and tubes may be made of stainless steel and containers may be made of a combination of glass and flexible plastic; etc.). Any suitable material or combination of materials may be used for the components described herein without departing from the broad scope of the present disclosure.

In addition, the shapes shown and illustrated in the various FIGURES are for example purposes only. Various other shapes may be used herein without changing the scope of the present disclosure. For example, housing 12 may be conical, cylindrical, pyramidal, etc., without departing from the broad scope of the embodiments. Likewise, tubes 16 may be rigid, or flexible 18 without departing from the scope of the broad embodiments.

While the disclosure references several particular embodiments, those skilled in the art will be able to make various modifications to the described embodiments without departing from the true spirit and scope of the disclosure. It is intended that all elements or steps which are insubstantially different from those recited in the claims but perform substantially the same functions, respectively, in substantially the same way to achieve the same result as what is claimed are within the scope of the disclosure.

What is claimed is:

1. An apparatus for simultaneously filling balloons, comprising:

a fitting comprising an inlet and at least four outlets; and at least four branch assemblies coupled to the fitting, each branch assembly comprising:

a tube extending from the fitting at a respective one of the at least four outlets;

a balloon with a neck disposed around an end of the tube; and

a fastener attaching the neck of the balloon to the end of the tube, the fastener configured to restrict detachment of the balloon from the tube and to automatically seal the balloon upon detachment of the balloon from the tube, the restriction of the fastener being limited such that the balloon, if filled with a sufficient amount of water, is detachable by gravity combined with a manually applied acceleration of the tube.

2. The apparatus of claim 1, wherein, for the at least four branch assemblies, the balloons are disposed in sufficient proximity to each other such that, if water is introduced into the balloons, at least two of the balloons press against each other as they expand.

3. The apparatus of claim 1, wherein at least first and second tubes of the at least four branch assemblies are flexible to accommodate filling their respective balloons with fluid, such that, in operation, the distance between the respective ends of the first and second tubes increases as the balloons expand.

4. The apparatus of claim 1, wherein the apparatus is sufficiently compact to be operated while being held by hand, and is configured to enable a single operator to simultaneously introduce water into each balloon of the at least four branch assemblies and to simultaneously detach each balloon of the at least four branch assemblies.

7

5. The apparatus of claim 1, wherein, for the at least four branch assemblies, the outlets are not disposed along a single line with respect to each other, and the tubes each extend from the fitting in the same direction.

6. The apparatus of claim 1, wherein, for the at least four branch assemblies, the tubes are substantially parallel with respect to each other, at least while the balloons are unfilled.

7. The apparatus of claim 1, where in the fastener an elastic ring.

8. An apparatus comprising:

a housing comprising an inlet and at least four outlets; and at least four branch assemblies coupled to the housing, each branch assembly comprising:

a tube extending from the housing at a respective one of the at least four outlets;

a balloon with a neck disposed around an end of the tube; and

a fastener attaching the balloon to the tube, the fastener configured to restrict detachment of the balloon from the tube and to automatically seal the balloon upon detachment of the balloon from the tube, the restriction of the fastener being sufficiently limited to permit the balloon to detach from the tube by at least partially filling the balloon with water;

wherein the apparatus is configured to fill the balloons of the at least four branch assemblies substantially simultaneously with water.

9. The apparatus of claim 8, wherein, for the at least four branch assemblies, the balloons are disposed in sufficient proximity to each other such that, if water is introduced into the balloons, at least two of the balloons press against each other as they expand.

10. The apparatus of claim 8, wherein at least first and second tubes of the at least four branch assemblies are flexible to accommodate filling their respective balloons with fluid, such that, in operation, the distance between the respective ends of the first and second tubes increases as their balloons expand.

11. The apparatus of claim 8, wherein the apparatus is sufficiently compact to be operated while being held by hand of a single operator.

12. The apparatus of claim 8, wherein at least first and second balloons of the at least four branch assemblies are disposed sufficiently close to each other such that they press against each other, regardless whether the first and second balloons are in a filled state or an unfilled state.

13. The apparatus of claim 8, wherein, for the at least four branch assemblies, the outlets are not disposed along a

8

single line with respect to each other, and the tubes each extend from the housing in the same direction.

14. The apparatus of claim 8, wherein, for the at least four branch assemblies, the tubes are substantially parallel with respect to each other, at least while the balloons are unfilled.

15. The apparatus of claim 8, wherein the fastener is an elastic ring.

16. An apparatus comprising:

a fitting configured to couple to a pressurized supply of fluid; and

at least three branch assemblies extending from the fitting, each branch assembly comprising:

a tube coupled to the fitting at a first end;

a balloon comprising a neck portion having a second end of the tube inserted therethrough; and

a fastener comprising an opening having the second end of the tube inserted therethrough, the fastener configured to: removably couple the balloon to the tube, permit fluid from the pressurized supply of fluid to pass through the tube and into the balloon, and automatically restrict the fluid from exiting the balloon through the neck portion upon decoupling the balloon and fastener from the tube.

17. The apparatus of claim 16, wherein the balloon, upon being filled with a sufficient mass of fluid from the pressurized supply of fluid, is detachable from the tube by gravity in combination with an upward acceleration of the tube.

18. The apparatus of claim 16, wherein the balloon is automatically detachable from the tube in response to being filled with a sufficient mass of fluid from the pressurized supply of fluid.

19. The apparatus of claim 16, wherein for the at least three branch assemblies, each balloon presses against at least one other balloon in response to the balloons being sufficiently pressurized with fluid from the pressurized supply of fluid.

20. The apparatus of claim 16, wherein for the at least three branch assemblies, each of the balloons is in contact with at least another respective one of the balloons.

21. The apparatus of claim 16, wherein the respective second ends of at least two tubes of the at least three branch assemblies are configured to flex away from each other in response to their respective balloons being pressurized with sufficient amounts of fluid from the pressurized fluid supply.

22. The apparatus of claim 16, wherein the fitting comprises a female garden hose thread.

23. The apparatus of claim 16, wherein the fastener is an elastic ring.

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